In the Claims

What is claimed is:

1. A method for communicating an Internet message between a source and a destination over the Internet, comprising:

(a) selecting a node of a first type;

(b) selecting a node of a second type;

(c) communicating an Internet message from the source to the node of the first type using a first protocol;

(d) communicating the Internet message from the node of the first type to the node of the second type using a second protocol; and

(e) communicating the Internet message from the node of the second type to the destination using a third protocol.

2. A method for communicating an Internet message between a source and a destination over the Internet, comprising:

(a) selecting a node of a first type;

(b) communicating an Internet message from the source to the node of the first type using a first protocol;

(c) communicating the Internet message from the node of the first type to a node of a second type using a second protocol; and

(d) communicating the Internet message from the node of the second type to the destination using a third protocol.

3. The method of claim 1 wherein the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type, determining a measure of communications performance for a sub-link between the source and the candidate node of the first type; and

(a2) selecting a node of the first type from among the plurality of candidate nodes of the first type to optimize the measure of communications performance.

4. The method of claim 2 wherein the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type, determining a measure of communications performance for a sub-link between the source and the candidate node of the first type; and

(a2) selecting a node of the first type from among the plurality of candidate nodes of the first type to optimize the measure of communications performance.

5. The method of claim 1 wherein the selecting step (b) comprises:

(b1) for each of a plurality of candidate nodes of the second type, determining a measure of communications performance for a sub-link between the destination and the candidate node of the second type; and

(b2) selecting a node of the second type from among the plurality of candidate nodes of the second type to optimize the measure of communications performance.

6. The method of claim 1 wherein the selecting step (b) comprises:

(b1) for each of a plurality of candidate nodes of the second type, determining a measure of communications performance for a sub-link between the candidate node of the first type and the candidate node of the second type; and

(b2) selecting a node of the second type from among the plurality of candidate nodes of the second type to optimize the measure of communications performance.

7. The method of claim 1 wherein:

step (a) comprises selecting the node of the first type so as to optimize a measure of communications performance for at least a sub-link in a link from the source to the destination via the node of the first type and the node of the second type; and

step (b) comprises selecting the node of the second type so as to optimize a measure of communications performance for at least a sub-link in a link from the source to the destination via the node of the first type and the node of the second type.

8. The method of claim 1 wherein

the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type, determining a first measure of communications performance for a sub-link between the source and the candidate node of the first type; and

(a2) selecting a node of the first type from among the plurality of candidate nodes of the first type to optimize the first measure of communications performance; and

the selecting step (b) comprises:

(b1) for each of a plurality of candidate nodes of the second type, determining a second measure of communications performance for a sub-link between the node of the first type and each candidate node of the second type, and a third measure of performance for a sub-link between the candidate node of the second type and the destination; and

(b2) selecting a node of the second type from among the plurality of candidate nodes of the second type to optimize a combination of the second and third measures of communications performance.

9. A method for communicating an Internet message between a source and a destination over the Internet, comprising:

(a) selecting a node of a first type and a node of a second type;

(b) communicating an Internet message from the source to the node of the first type using a first protocol;

(c) communicating the Internet message from the node of the first type to the node of the second type using a second protocol; and

(d) communicating the Internet message from the node of the second type to the destination using a third protocol.

10. The method of claim 9 wherein the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type, determining a first measure of communications performance for a sub-link from the source to the candidate node of the first type;

(a2) for each of a plurality of nodes of the second type, determining a second measure of communications performance for a sub-link between each candidate node of the first type and each candidate node of the second type, and a third measure of communications performance for a sub-link between each candidate node of the second type and the destination; and

(a3) selecting a node of the first type from among the plurality of candidate nodes of the first type and a node of the second type from among the plurality of candidate nodes of the second type to optimize a combination of the first, second and third measures of communications performance.

11. The method of claim 9 wherein the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type and candidate nodes of the second type, determining a measure of communications performance for at least a sub-link in a link from the source to the destination via the candidate node of the first type and the candidate node of the second type; and

(a2) selecting a combination of the node of the first type from the plurality of candidate nodes of the first type and the node of the second type from the plurality of candidate nodes of the second type so as to optimize the measure of communications performance.

12. The method of claim 9 wherein the selecting step (a) comprises:

(a1) for each of a plurality of candidate nodes of the first type and candidate nodes of the second type, determining a measure of communications performance for a sub-link between the candidate node of the first type and the candidate node of the second type; and

(a2) selecting the node of the first type from the plurality of candidate nodes of the first type and selecting the node of the second type from the plurality of candidate nodes of the second type so as to optimize the measure of communications performance.

13. The method of claim 1 further comprising the steps of:

(f) communicating a second Internet message from the destination to the node of the second type using a fourth protocol;

(g) communicating the second Internet message from the node of the second type to the node of the first type using a fifth protocol; and

(h) communicating the second Internet message from the node of the first type to the source using a sixth protocol.

14. The method of claim 9 further comprising the steps of:

(e) communicating a second Internet message from the destination to the node of the second type using a fourth protocol;

(f) communicating the second Internet message from the node of the second type to the node of the first type using a fifth protocol; and

(g) communicating the second Internet message from the node of the first type to the source using a sixth protocol.

15. A method for communicating an Internet message between a source and a destination over the Internet, comprising:

(a) selecting a node of a first type;

(b) communicating an Internet message from the source to the node of the first type using a first protocol;

(c) a node of a second type intercepting the Internet message from the node of the first type, the Internet message from the node of the first type being communicated using a second protocol; and

(d) communicating the Internet message from the node of the second type to the destination using a third protocol.

16. A method for communicating an Internet message between a source and a destination over the Internet, comprising:

(a) selecting a node of a second type;

(b) a node of a first type intercepting an Internet message from the source, the Internet message from the source being communicated using a first protocol;

(c) communicating the Internet message from the node of the first type to the node of the second type using a second protocol; and

(d) communicating the Internet message from the node of the second type to the destination using a third protocol.

17. The method of claim 1 wherein the communicating step (c) comprises redirecting the Internet message from the source to the node of the first type.

18. The method of claim 2 wherein the communicating step (b) comprises redirecting the Internet message from the source to the node of the first type.

19. The method of claim 9 wherein the communicating step (b) comprises redirecting the Internet message from the node of the first type to the node of the second type.

20. The method of claim 1 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

21. The method of claim 2 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

22. The method of claim 9 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

23. The method of claim 13 wherein the fourth protocol is a standard protocol, the fifth protocol is a high-performance protocol, and the sixth protocol is a standard protocol.

24. The method of claim 14 wherein the fourth protocol is a standard protocol, the fifth protocol is a high-performance protocol, and the sixth protocol is a standard protocol.

25. The method of claim 15 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

26. The method of claim 16 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

27. The method of claim 20 wherein the Internet message is a World-Wide Web message.

28. The method of claim 21 wherein the Internet message is a World-Wide Web message.

29. The method of claim 22 wherein the Internet message is a World-Wide Web message.

30. The method of claim 23 wherein the Internet message is a World-Wide Web message.

31. The method of claim 24 wherein the Internet message is a World-Wide Web message.

32. The method of claim 25 wherein the Internet message is a World-Wide Web message.

33. The method of claim 26 wherein the Internet message is a World-Wide Web message.

34. A method for providing web content to a source from a destination, comprising:

(a) selecting a node;

(b) communicating an Internet message requesting web content from a source to the node;

(c) if the node includes the requested web content in its cache, communicating the web content from the node to the source; and

(d) if the node does not include the requested web content in its cache, communicating the Internet message requesting web content from the node of the first type to the destination;

wherein the node is selected so as to optimize a measure of communications performance, the measure of communications performance including at least a metric for communications performance for a sub-link between the node and the destination.

35. The method of claim 34, wherein the measure of communication performance is a combination of the network distance between the source and the node, the network distance from between the node and the server, and the probability that the requested web content is in the cache of the node.

36. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a first selector to identify a node of a first type from the one or more nodes of a first type and communicate the selection to the source;

a second selector to identify a node of a second type from the one or more nodes of a second type and communicate the selection to a selected node of a first type;

wherein each node of a first type comprises:

a receiver to receive the Internet message from the source using a first protocol;

a transmitter to communicate the message to a selected node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

37. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a selector to identify a node of a first type from the one or more nodes of a first type and communicate the selection to the source;

wherein each node of a first type comprises:

a receiver to receive the Internet message from the source using a first protocol;

a transmitter to communicate the message to a node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

38. The system of claim 36 wherein:

the first selector identifies a node of the first type that optimizes a first measure of communications performance for a sub-link between the source and each of a plurality of candidate nodes of the first type.

39. The system of claim 37 wherein:

the first selector identifies a node of the first type that optimizes a first measure of communications performance for a sub-link between the source and each of a plurality of candidate nodes of the first type.

40. The system of claim 36 wherein:

the second selector identifies a node of the second type that optimizes a measure of communications performance for a sub-link between a selected node of the second type and the destination.

41. The system of claim 36 wherein:

the first selector identifies a node of the first type that optimizes a measure of communications performance for at least a sub-link in a link from the source to the destination via the node of the first type and the node of the second type; and

the second selector identifies a node of the second type that optimizes a measure of communications performance for at least a sub-link in a link from the source to the destination via the node of the first type and the node of the second type.

42. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a selector to identify a node of a first type from the one or more nodes of a first type and communicate the selection to the source, and to identify a node of a second type from the one or more nodes of a second type and provide the selection to a selected node of a first type;

wherein each node of a first type comprises:

a receiver to receive the Internet message from the source using a first protocol;

a transmitter to communicate the message to a selected node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

43. The system of claim 42 wherein the selector identifies a node of the first type and a node of the second type that optimize a measure of communications performance for a sub-link between the source and the node of the first type, a sub-link between the node of the first type and the node of the second type, and a sub-link between the node of the second type and the destination.

44. The system of claim 42 wherein the selector identifies a node of the first type and a node of the second type that optimize a measure of communications performance for at least a sub-link in a link between the source and the destination.

45. The system of claim 36 wherein:

the node of the second type further comprises a receiver to receive a second Internet message from the destination using a fourth protocol, and a transmitter to communicate the second Internet message to the node of the first type using a fifth protocol; and

the node of the first type further comprises a receiver to receive the second Internet message from the node of the first type using the fifth protocol, and a transmitter to communicate the second Internet message to the source using a sixth protocol.

46. The system of claim 42 wherein:

the node of the second type further comprises a receiver to receive a second Internet message from the destination using a fourth protocol, and a transmitter to communicate the second Internet message to the node of the first type using a fifth protocol; and

the node of the first type further comprises a receiver to receive the second Internet message from the node of the first type using the fifth protocol, and a transmitter to communicate the second Internet message to the source using a sixth protocol.

47. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a selector to identify a node of a second type from the one or more nodes of a second type and provide the selection to a node of the first type;

wherein each node of a first type comprises:

an interceptor to intercept the Internet message from the source using a first protocol;

a transmitter to communicate the message to a selected node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

48. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a first selector to identify a node of a first type from the one or more nodes of a first type and communicate the selection to a redirector;

a second selector to identify a node of a second type from the one or more nodes of a second type and provide the selection to a selected node of a first type;

the redirector to redirect the Internet message from the source to the selected node of a first type;

wherein each node of a first type comprises:

a receiver to receive the Internet message from the redirector using a first protocol;

a transmitter to communicate the message to a selected node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

49. A system for communicating an Internet message from a source to a destination over the Internet, comprising:

a plurality of nodes including one or more nodes of a first type and one or more nodes of a second type; and

a selector to identify a node of a first type from the one or more nodes of a first type and communicate the selection to a redirector;

the redirector to redirect the Internet message from the source to the selected node of a first type;

wherein each node of a first type comprises:

a receiver to receive the Internet message from the redirector using a first protocol;

a transmitter to communicate the message to a node of the second type using a second protocol; and

each node of the second type comprises:

a receiver to receive the message from a selected node of the first type; and

a transmitter to communicate the message to the destination using a third protocol.

50. The system of claim 36 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

51. The system of claim 37 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

52. The system of claim 42 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

53. The system of claim 45 wherein the fourth protocol is a standard protocol, the fifth protocol is a high-performance protocol, and the sixth protocol is a standard protocol.

54. The system of claim 46 wherein the fourth protocol is a standard protocol, the fifth protocol is a high-performance protocol, and the sixth protocol is a standard protocol.

55. The system of claim 45 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

56. The system of claim 46 wherein the first protocol is a standard protocol, the second protocol is a high-performance protocol, and the third protocol is a standard protocol.

57. The system of claim 50 wherein the Internet message is a World-Wide Web message.

58. The system of claim 51 wherein the Internet message is a World-Wide Web message.

59. The system of claim 52 wherein the Internet message is a World-Wide Web message.

60. The system of claim 53 wherein the Internet message is a World-Wide Web message.

61. The system of claim 54 wherein the Internet message is a World-Wide Web message.

62. The system of claim 55 wherein the Internet message is a World-Wide Web message.

63. The system of claim 56 wherein the Internet message is a World-Wide Web message.

64. A system for providing web content to a source from a destination, comprising:

a plurality of nodes; and

a selector to identify a node from the one or more nodes and communicate the selection to the source;

wherein each node comprises:

a receiver to receive an Internet message comprising a request for web content from the source using a first protocol;

a cache;

a first transmitter to communicate the message to a selected node of the second type using a second protocol; and

a second transmitter to communicate web content from the cache to the source;

wherein the selector selects the node to optimize a measure of communications performance, the measure of communications performance including at least a metric for a sub-link between the node and the destination.

65. The system of claim 64, wherein the measure of communications performance is a combination of the network distance between the source and the node, the network distance between the node and the server, and the probability that the requested web content is in the cache of the node.

66. A method for communicating two Internet messages from a source to a destination, comprising:

(a) separating a first message into a template and a customization portion;

(b) communicating the template to the destination;

(c) separating a second message into the template and the customization portion;

(d) communicating the second customization portion to the destination;

wherein the template includes information to reconstruct the second message from the second customization part.